

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars:

1. Amendments and Support for Same

By the Response, claims 1 and 16 has been amended to more particularly point out and distinctly claim the subject matter of the invention by incorporating all of the features of claim 13. No new matter has been added. Accordingly, claims 1-10, 12, and 14-16 are respectfully submitted for consideration. Approval and entry of the amendments are respectfully requested.

2. Rejection under 35 U.S.C. §103(a)

With respect to the rejection of claims 1-4, 12 and 14 under 35 U.S.C. §103(a) as being obvious over Yanaka (JP 2004-175230) in view of Watanabe (JP 2001-030933), to the rejection of claims 5-10 under 35 U.S.C. §103(a) as being obvious over Yanaka and Watanabe and further in view of Kawashima (US 6,542,801), and to the rejection of claims 15-16 under 35 U.S.C. §103(a) as being obvious over Yanaka and Watanabe in further view of Tanaka (JP 2003-327150), Applicant respectfully traverses the rejection at least for the reason that Yanaka, Watanabe, Kawashima, and Tanaka, combined or separately, fails teach, disclose, or suggest each and every limitation recited in the rejected claims.

According to the embodiment recited in amended claims 1 and 16, the steering controller controls the steering actuator or the steering speed (not the traveling speed) in relation to the steering angle.

Further, as shown in Fig. 13B, the actuation speed V of the steering cylinder (i.e. the steering speed) is varied in correspondence with the steering angle γ . Particularly, when the steering angle γ is within the reference amount $+\gamma$, $-\gamma$ (i.e. $-\gamma < \gamma < +\gamma$), the first actuation speed $V1$ is used.

Further, as shown in Fig. 13B, when the steering angle γ is larger than the reference amount $+\gamma'$ or $-\gamma'$ (i.e. $\gamma > +\gamma'$ or $\gamma < -\gamma'$), the second actuation speed V2, which is slower than the first actuation speed V1, is used.

The above-discussed features supported in Fig. 13B are recited in claim 1, wherein the steering control controller is configured to actuate the steering actuator at a first actuation speed if the size of the steering angle is a predefined reference amount or lower, and to actuate the steering actuator at a second actuation speed, which is lower than the first actuation speed, for the same operation command when the size of the steering angle exceeds the reference amount.

Applicant respectfully submits that it is an advantage of the presently claimed invention to include the actuation speed V of the steering cylinder (i.e. the steering speed) being varied in correspondence with the steering angle γ because of the structure of the steering mechanism, as shown in Fig. 13A. For example, as shown in Fig. 3, the apparatus comprises a steering mechanism having a pair of knuckle arms for swingably supporting a pair of the wheels to be steered around kingpin axes, and a tie rod for connecting the pair of knuckle arms, wherein the steering actuator is configured to drive the steering mechanism to change the steering angles of the wheels.

Due to the steering mechanism, for example, the steering angle γ varies slower in the middle range ($-\gamma' < \gamma < +\gamma'$), and the steering angle γ varies faster in the both side ranges ($\gamma > +\gamma'$ and $\gamma < -\gamma'$). Hence, to compensate for the differences in the steering speed in accordance with the steering angle, the actuation speeds of the steering cylinder is controlled as mentioned above.

Applicant respectfully asserts that Watanabe generally describes to reduce the steering speed at the both ends of the steering angle (or range) to avoid a shock caused at the both ends. Specifically, as described in the abstract thereof, the electric power steering device of Watanabe provides a constantly light steering operation of a steering wheel and to reduce shock when the steering angle of the steering wheel reaches the maximum steering angle in the electric power steering device. Hence, Watanabe does not describe the feature wherein the steering control controller is configured to actuate the steering actuator such that the larger the detected steering angle with respect to a

straight forward direction of the wheel, the slower the actuation speed of the steering actuator actuated by the steering controller, as recited in amended claims 1 and 16.

Further, Applicant respectfully asserts that Yanaka, Kawashima, and Tanaka fail to teach, disclose the feature wherein the steering control controller is configured to actuate the steering actuator such that the larger the detected steering angle with respect to a straight forward direction of the wheel, the slower the actuation speed of the steering actuator actuated by the steering controller, as recited amended claims 1 and 16. Specifically, Yanaka only discloses to regulate the travelling speed of the vehicle in accordance with an operational state of the steering operation device.

Still further, Yanaka, Watanabe, Kawashima, and Tanaka, combined or separately, also fails to teach, disclose, or suggest the feature wherein the steering control controller is configured to actuate the steering actuator at a first actuation speed if the size of the steering angle, which is obtained on the basis of detection information from the steering angle detector, is a predefined reference amount or lower, and to actuate the steering actuator at a second actuation speed, which is lower than the first actuation speed, for the same operation command when the size of the steering angle exceeds the reference amount, as recited in amended claim 1.

As Yanaka, Watanabe, Kawashima, and Tanaka, combined or separately, fails to teach, disclose, or suggest all of Applicant's claimed features as recited in pending independent claims 1 and 16, and their respective dependent claims 2-10, 12, and 14-15, the reliance of Yanaka, Watanabe, Kawashima, and Tanaka in the obviousness rejection of the claims is improper.

In view of the amendment and arguments set forth above, Applicant respectfully requests reconsideration and withdrawal of the 103(a) rejection of claims 1-10 and 12-16.

4. Conclusion

In view of the amendments to the claims, and in further view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is requested that claims 1-10, 12, and 14-16 be allowed and the application be passed to issue.

If any issues remain that may be resolved by a telephone or facsimile communication with the Applicant's representative, the Examiner is invited to contact the undersigned at the numbers shown.

Further, while no fees are believed to be due, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-4525.

Respectfully submitted,

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